Blending Libras and Portuguese: Acceptability Variables

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1 Bimodal Bilingualism

The bimodal bilinguals who are the focus of this study are adults who grew up in deaf families, with either one or both parents deaf signers. Our broader study includes Codas from both the USA and Brazil, but in this chapter, we will present the analysis of one specific study based on the Brazilian data alone. The broader study examined the linguistic characteristics of participants by analyzing languages in three modes: speech, sign, and the combination of sign and speech in which both languages are blended simultaneously. The results presented here are based on a study focused on the acceptability of code-blends among Codas, supplemented by elicited production data.

This is a special case of bilingualism, known as bimodal bilingualism, and it displays many of the same properties of unimodal bilingualism, but also some unique forms (Emmorey et al. 2008). We focus on different possibilities of combining the two languages, which are not possible when the languages are of the same modality. Thus, uniquely, bimodal bilinguals can produce both languages at the same time, because the languages used primarily employ different modalities for production and perception. Following Emmorey et al. (2008), we call such productions code-blends.

Code-blending frequently involves spelling out a single meaning in the two languages, although often one modality will contain more grammatical or content

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C. Rodrigues, A. Saab (eds.), *Formal Approaches to Languages of South America*,
https://doi.org/10.1007/978-3-031-22344-0_5

information than the other. Examples of "full" and "partial" code-blending are given in (1)–(2).[1]

(1) Full blending

LIBRAS	IX(eu) I	COMPRAR bought	VESTIDO dress	DV(estampa) print	FLOR flower
BP	Eu	comprei	vestido	estampa	flor
'I bought a flower print dress.'					

https://youtu.be/L1GpoO5qkCY

(2) Partial blending

LIBRAS	IX(eu) I	VISITAR visited	FAMÍLIA family	DEM there	TER… have
LIBRAS	QUATRO four	TV+ TV			
BP	quatro	tevês			
'I visited a family who had four TVs.'					

https://youtu.be/SXvxEWPfU2Q

Our main goal in this chapter is to understand better what the derivational mechanisms underlying code-blends are. To do so, we conducted an experimental study consisting of a judgment task and an elicitation task. As we will discuss, a factor manipulated in the experiments was the type of syntactic structure, in which we included transitive, negative, and passive sentences as well as idiomatic expressions. By considering these specific structures, we are able to analyze how syntactic differences between Brazilian Portuguese and Libras are accommodated

[1] The examples use the following notation: On the LIBRAS tier, capitalized words are glosses for signs in Libras and lower-case is used to provide English translations for the glosses. On the BP tier, lower-case is used for words spoken in Portuguese. The Portuguese glosses for the signs employ the identification conventions for each sign established in Libras Signbank (https://signbank.libras.ufsc.br/) when they were available; for the signs that were not already identified in the Signbank, we coded the sign by a new specific gloss to be added to the Signbank later. Pointing is annotated with IX (for "index"). In the formatting of examples, the signs and spoken words are aligned following the timing used in the blending as produced by the participant.

under blending. These differences can result in either congruent or incongruent code-blends. In incongruent code-blends, each language is produced following its own derivational possibilities in such a way that consequently, the sentences produced through signs and speech are produced with contrasting word orders. Congruent blends, on the other hand, display a variety of types of synthesis of the two languages without differing in word order. For example, there may be a one-to-one correspondence between content words in sign and speech; or there may be more information produced in one or the other language; or one language might use a language-specific form, while the other produces a near translation (an example is found when classifiers are produced in Libras alongside a phrase in Portuguese; see Quadros et al. 2020a, b).

In order to explain code-blendings, we considered two theoretical proposals: Branchini and Donati's (2016) analysis, based on blendings in Italian Sign Language (LIS)/spoken Italian, and the so-called Synthesis Model (Lillo-Martin et al. 2010, 2016; Koulidobrova 2012, 2016). These proposals are considered and discussed in view of the results obtained in our study.

The present study grows out of a long-term investigation conducted by us on the Development of Bimodal Bilingualism (funded by NIH; see https://slla.lab.uconn.edu/bibibi/). In the main project, we collected and analyzed longitudinal spontaneous production data from bimodal bilingual children in the USA and Brazil, with ages ranging from 18 months to 6 years (Chen Pichler et al. 2016; Lillo-Martin et al. 2010, 2014, 2016; Quadros et al. 2012, 2014; Quadros 2017). We also conducted language studies with older children, ages 4–7, to assess their language use at the phonological, morphological, lexical, syntactic, and discourse levels (Quadros et al. 2015). Our sample included *Kodas* (Coda kids) and Deaf native signers who received one or two cochlear implants and were developing bilingually in sign and speech (Davidson et al. 2014; Goodwin and Lillo-Martin 2019).

The theoretical proposal of the Synthesis Model was adopted as an account for the unique forms observed when the bimodal bilinguals show evidence of cross-linguistic influence and code-blending (Lillo-Martin et al. 2010, 2016; Koulidobrova 2012, 2016). Following MacSwan's proposal (2000, 2005), we considered that the bilingual language architecture is essentially the same as that for monolinguals, except for the existence of two lexicons. However, we added the basic concepts of *Distributed Morphology* (Halle and Marantz 1993), in particular, the idea that the input to a derivation is an abstract element not specified for phonological form, with Vocabulary Insertion happening late in the derivation. The DM approach provides not only a useful broad conception compatible with code-blending (late insertion), but also an explicit way for forming predictions, some of which will be discussed in the current chapter. We dubbed this approach *Language Synthesis*, intending to convey the idea that the computational system of grammar can synthesize pieces from multiple languages while running a single derivation. We suggested this proposal predicts the existence of code-blending whenever it is not prevented by the multiple articulatory interfaces, as is the case for bimodal bilinguals. Figure 1 provides a representation of the architecture of the Synthesis Model.

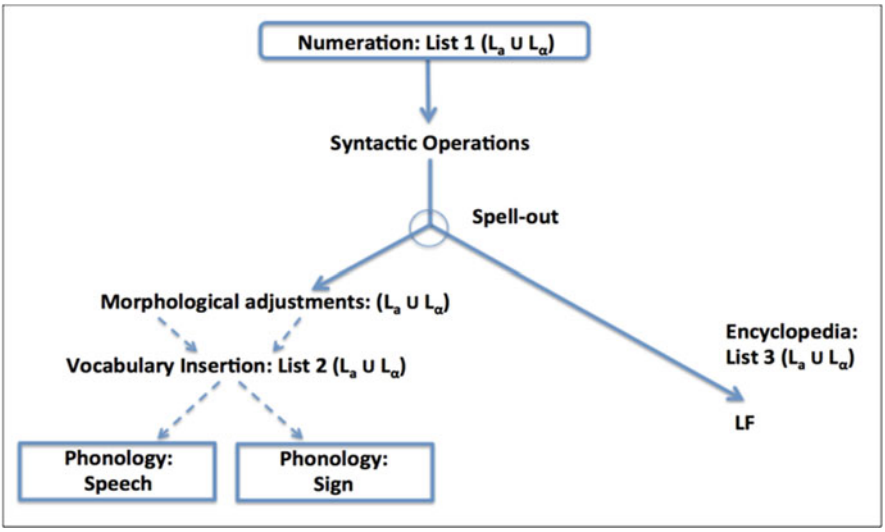

Fig. 1 Language synthesis model. (Lillo-Martin et al. 2016: 730; reproduced with permission)

Note that, under this approach, only one derivation feeds spell-out, starting from a single numeration that may contain abstract elements (features) associated with both languages. It is only after spell-out that elements from two languages are simultaneously introduced. Of course, this last step is not part of standard DM assumptions, since the theory was proposed in the absence of knowledge about code-blending.

The study we present here is designed to assess constraints on code-blending, aiming at understanding the derivational procedure that gives rise to this phenomenon. To do so, we started by investigating which types of blends are allowed and which ones are ruled out. As already pointed out (Emmorey et al. 2005, 2008; van den Bogaerde and Baker, 2005, 2008; Lillo-Martin et al. 2010, 2016), the output of a synthesis has to be a single proposition. If so, code-blends should not be able to express different concepts coming from the two different modalities. This prediction is tested most prominently in our acceptability judgment study in connection with idiomatic expressions.

In general, co-insertion of near translation equivalents (Emmorey et al. 2008; Lillo-Martin et al. 2010, 2014, 2016) should pose no problem. As illustrated in (1)–(2) above, whenever productions in the two languages follow the same surface word order, they are labeled congruent, although, generally, one of the blended languages provides the functional categories that determine the course of the derivation. In the most common cases, the two languages use parallel structures, so that the blending allows both languages to use structures generally produced in monolingual settings. Such examples are common. In other cases, word order comes from one of the languages (the primary language of the sentence) to the possible exclusion of word-order preferences observed in the secondary language. When this happens, a

derivation is generated, but we predict it is not fully acceptable due a preference for congruence at the word-order level.

As discussed earlier, incongruent code-blending occurs when the two languages use overtly different word orders (e.g., OV and VO). According to the Synthesis Model, incongruent word orders can be generated if linearization is a late operation, so that producing one order in speech and a different order in sign is possible. However, in these cases difficulties in processing might be observed, since the opposing word orders can lead to an increased memory load. Our prediction is that different linearization of strings under a single node may be acceptable, at least for short strings which impose lower processing costs. Across signers, however, such cases might not be rated as highly as congruent ones. (3) exemplifies a case of different linearizations, as in this example Libras and PB contrast with respect to the linear order between the negation and the verb.

(3) Blending with different word orders

LIBRAS	HOMEM man	**ANDAR** walk	**NÃO** not	IR went	ÔNIBUS bus
BP	O homem	**não**	**andou**	foi	de ônibus

'The man did not walk, he took the bus'.

https://youtu.be/WMUqXQEKQlk

Other types of syntactic restrictions might apply as well in code-blending, stemming from a single derivation process. For example, even in favorable pragmatic contexts we do not expect blends such as (4), combining transitive and intransitive argument structures, to be acceptable.

(4) Unexpected blending: different argument structures

LIBRAS		CASA INCENDIAR house burn
BP	O homem	incendiou a casa

'The man burned the house/ the house burned.'

https://youtu.be/YbFBQMwclCo

A different conclusion about incongruent blends is provided by Branchini and Donati (2016), based on examples of code-blending in Italian Sign Language (LIS) and spoken Italian. According to the authors' findings, it is possible for bimodal bilinguals to produce completely distinct structures in the two languages

simultaneously, while the morphology and prosody of each language are preserved. The authors give the following example, which involves a word-order change along the lines of the example in (3).

(5) Italian/LIS

It:	Cosa	ha	mangiato	la	rana?
	what	have.3SG	eat-PTCP the	frog	
LIS:	FROG		EAT	$[WHAT]_{WH}$	

"What did the frog eat?"

(Branchini and Donati 2016, p.11)

This observation led Branchini and Donati to propose that the computational system can run two different derivations at the same time. However, they do not propose any specific constraints on these combinations. Thus, we understand that they may predict (4) to be possible, although they provide no examples of this sort.

In order to verify the licensing of syntactically incongruent structures and, afterwards, compare Branchini and Donati's proposal with the proposal put forward in the Synthesis Model, we designed an acceptability judgment experimental study. To the best of our knowledge, this is the first study on code-blending using this specific experimental methodology, although it has been successfully used in studies of code-switching by unimodal bilinguals (cf. Schütze and Sprouse 2014). We expected participants to be able to judge the acceptability of code-blends, based on our previous discussions about code-blending with bimodal bilingual linguists.

In order to supplement our acceptability judgment task, we also ran a follow-up study, an elicitation task, with Codas.

2 The Present Study[2]

The acceptability judgment task and the elicitation task conducted by us aimed at identifying possible restrictions that may apply to blended sentences of Libras and BP. The tasks include stimuli items with word-order differences among the two languages to address the general question of "what word-order differences are observable in blended structures?". By investigating both possible and impossible instances of blending, we hope we are able to verify the adequacy of the Synthesis Model as a formal explanation for code-blending in Libras and BP.

[2] This research was approved by an ethical committee and the participants were volunteers who provided an informed consent, in accordance with the Brazilian CNS-CONEP resolution No. 196/96 version 2012, CAAE: 84511918.0.0000.0121.

2.1 Participants

22 Brazilian bimodal bilingual adults completed the acceptability judgment task, and a subset of 6 of these participants completed the elicitation task. All of them have typical hearing and were raised in households that use Libras as the primary language with one or two Deaf parents.

The selected final sample of participants contained individuals with high proficiency in both Libras and BP and individuals with more varied proficiency in Libras. We asked participants to provide a self-assessment of their own skills in Libras and in BP, on a scale from 1 "not fluent" to 7 "very fluent, native." We also assessed their vocabulary in both Libras and Portuguese using a picture-based assessment (Swadesh List; Swadesh 1971). Tables 1 and 2 present detailed information regarding participants, including their self-assessment of their signing and speech skills, and their vocabulary task results for both languages. Table 1 presents a general summary of each participant including their gender (F for female and M for male); their educational level; their self-assessment in each language where they had assigned from 1 (low fluency) to 7 (high fluency); and their score in the vocabulary test conducted in our experimental set of tests.

2.2 Materials and Procedure

The acceptability judgment task was designed to verify participants' acceptance of a variety of blended sentences, including congruent cases (i.e., simultaneously produced sentences following the same word order, which also were grammatical in both languages), and incongruent cases, in which the word order used in the two languages contrasts. We also considered 12 cases of co-insertion of the type commonly observed in code-blending, expected to be considered fully acceptable, and code-blended utterances designed to be clearly unacceptable by violating the syntax of both languages; in both cases these were used as fillers.

The target stimuli were produced by a fluent bimodal bilingual model and presented to participants, on video, in a quasi-randomized order, so that participants did not view more than two items of the same type in a row.

Participants viewed the video items and rated each one as fully unacceptable (1), intermediate (2), fully acceptable (3), or cannot judge, as illustrated in Fig. 2. Practice items were placed at the beginning of the experimental session to familiarize participants with the task. To set the scale endpoints clearly, during the practice session the experimenter discussed with participants the relative acceptability of different kinds of code-blending, considering extreme cases that are completely acceptable or completely unacceptable. Participants were encouraged to follow their first instinctive reaction in providing responses. Responses equal to or above 2.7 (average score) were classified as HIGH (fully acceptable), from 1.6 to 2.6 MIX (intermediate), and up to 1.5 LOW (fully unacceptable).

Table 1 Judgment task: participants' background information and proficiency in Libras and BP

Participant	Gender	Education level	Fluency self-assessment in BP[a]	Fluency self-assessment in Libras[a]	Libras vocabulary	BP vocabulary
0301	F	Complete high education level	7	7	77,1	97,0
0302	M	Complete high education level	7	6	73,0	95,0
0401	M	Complete high education level	7	7	99,2	99,0
0402	F	Master degree	7	7	95,5	98,0
0403	F	Incomplete high education level	7	7	95,1	95,0
0404	M	Complete high education level	7	7	96,3	96,2
0405	F	Complete high education level	6	7	94,3	96,0
0406	F	Complete high education level	5	7	95,1	100,0
0407	F	Incomplete high education level	6	6	85,3	91,6
0408	F	Master degree	7	7	98,4	94,8
0501	F	Incomplete high education level	6	7	96,3	97,0
0502	F	Complete high education level	6	7	96,3	99,0
0503	F	Complete high education level	7	7	97,1	98,0
0504	F	Incomplete high education level	7	5	77,9	92,0
0505	M	Doctor degree	7	7	93,0	98,0
0506	F	Master degree	6	6	99,6	98,0
0507	F	Complete high education level	6	5	93,1	98,0
0508	F	Complete high education level	7	6	95,9	94,0
0509	F	Incomplete high education level	7	7	95,9	98,0
0510	F	Complete high education level	7	7	93,9	94,0
0601	M	Complete high education level	7	4	66,1	89,2
0602	F	Complete high education level	6	6	97,9	94,2

[a]The Codas were asked to self-select one of the numbers in the fluency gradation in both Portuguese and Libras, with 1 meaning "not fluent" and 7 "very fluent, native"

Table 2 Elicitation task: participants' background information and proficiency in Libras and BP

Participant	Gender	Education level	Fluency self-assessment in BP[a]	Fluency self-assessment in Libras[a]	Libras vocabulary	BP vocabulary
20201	F	Master degree	7	7	92,1	97,2
20202	F	Doctor degree	7	7	97,2	95,3
20203	F	Complete high education level	7	7	98,4	99,1
20204	F	Master degree	7	7	95,5	98,0
20205	F	Complete high education level	7	6	95,92	94,0
20206[b]	F	Incomplete high education level	7	6	–	–

[a]The Codas were asked to self-select one of the numbers in the fluency gradation in both Portuguese and Libras, with 1 meaning "not fluent" and 7 "very fluent, native"

[b]This participant did not complete the vocabulary tasks

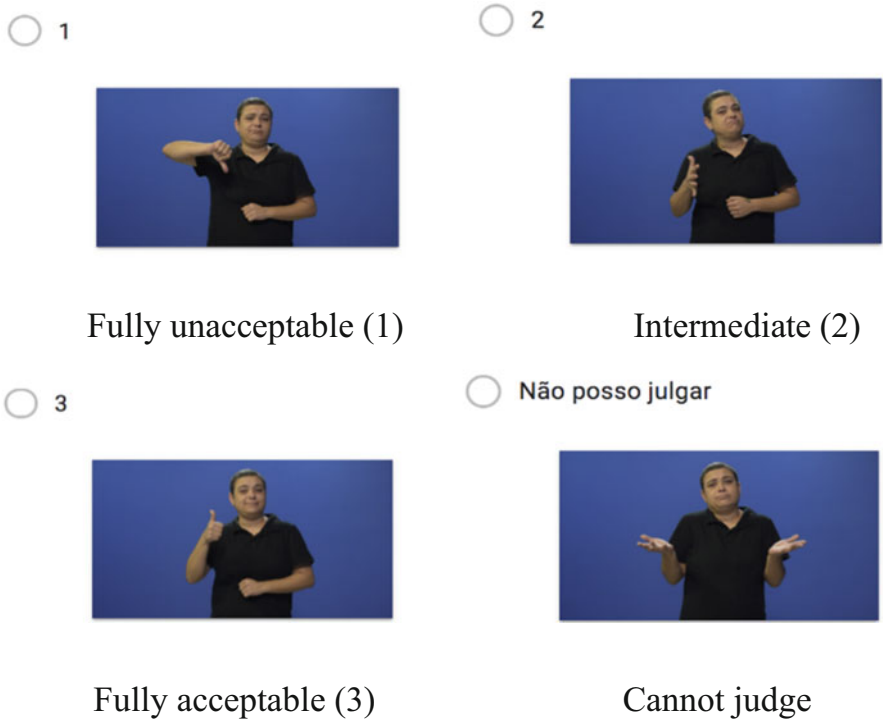

Fig. 2 Judgment scale

The type of sentential structure was manipulated as an independent variable. The types were: transitive structures, declarative negative sentences, passives, and sentences containing idiomatic chunks. Sentences representing these types were placed under the *congruent* condition if there were no word-order mismatches between the two languages. Mismatch cases were placed under the *incongruent* condition.

Transitive Sentences

Both Libras and BP are SVO languages. However, Libras optionally or obligatorily uses SOV in certain constructions which includes sentences containing verbs marked with aspect, agreement, spatial location, or handling classifiers (Quadros 1999; Quadros and Karnopp 2004). The sentences from the judgment task listed below illustrate congruent and incongruent blendings of transitive sentences:

(6) Congruence at word-order level (VO)

LIBRAS	IX (ele) He	DORMIR CL *sleep* CL(person-lying-in)	CAMA bed
BP	Ele	tá dormindo	na cama
'He is sleeping in the bed.'			

https://youtu.be/Piwny_TCKPY

(7) Incongruence at word-order level (Libras, OV; BP, VO)

LIBRAS	MULHER woman	TEMPO time	PARAR$_{[aspect]}$ stop
BP	A mulher	parou	o tempo
LIBRAS	CONGELAR frozen	TODO all	PESSOAS people
BP	e congelou	todas	as pessoas
'The woman stopped time and froze all the people.'			

https://youtu.be/TiLDWL5ApCc

(8) Congruence at word-order level (Libras, OV; BP, follows Libras OV)

LIBRAS	IX(eu) I	CHAMAR ask	MULHER woman
BP	Eu	chamo	mulher
LIBRAS	AJUDAR help	CASA house	LIMPAR clean
BP	ajuda	casa	limpar
'I ask the woman to help clean the house.'			

https://www.youtube.com/watch?v=bnuSknur5iY

(9) Incongruence at word-order level (Libras, OV; BP, VO)

LIBRAS	HOMEMa man	GATOb cat	aATIRARb shoot
BP	O homem	atirou	no gato
'The man shot the cat.'			

https://youtu.be/QpmlffUUdcY

Negative Sentences

In this sentential type, we included items in which BP followed the Libras negation-final word order, as in (10), and structures in which Libras is negation final while BP preserves its canonical pre-verbal negation as in (11).

(10) Congruence at word-order level (negation in final position)

LIBRAS	MENINO ELE-MESMO IX (ele) boy by-himself	ESCOLHER choose	SORVETE ice-cream
BP	O menino	escolheu	sorvete
LIBRAS	CHOCOLATE chocolat	ABACAXI pineapple	NÃO no
BP	de chocolate	abacaxi	não
'The boy chose chocolate ice-cream, not pineapple.'			

https://youtu.be/kSd6o7IxZgQ

(11) Incongruence at word-order level (Libras, post-verbal neg.; BP, pre-verbal neg.)

LIBRAS	COMIDA food	RS **PICANTE** RS hot	**NÃO** not
BP	A comida	gaúcha	**não é picante**
LIBRAS	MAS but	BAHIA Bahia	FS (é) is
BP	mas	a baiana	é
'Gaucho food is not spicy, but Bahian food is.'			

https://youtu.be/PH4AinX9ZX0

Passive Sentences

Portuguese has verbal passive construction, but there is no fully analogous construction in Libras. In order to explore this, we first considered structures along the lines discussed in Villanueva (2010) for American Sign Language (ASL). Villanueva considered the possibility that in ASL, analogues to passives are found in which the agent is "unfocused," where the Agent theta-role is not mapped onto the sentence structure or morphologically mapped onto the verb. We did not find examples exactly analogous to this in our data.

Another type of agent de-focusing construction observed in Libras is similar to the high-locus construction as described by Barberà and Hofherr (2017) for Catalan Sign Language (LSC). In Libras, loci in the signing space can be used for reference both in the pronominal system and in verb agreement. In the usual case, loci are used at roughly chest height. In contrast, when employing the high-locus construction the verb is signed with reference to a subject locus in a relatively high area of the signing space, roughly at head height. An overt determiner phrase (DP) may be signed at this locus, but it would consist of a non-specific indefinite pronoun. Whether overt or not, the subject with a verb using a high locus is thus interpreted as non-specific, indefinite. Although high-locus structures background the agent, Barberà and Hofherr (2017) argue that sentences of this type do not behave exactly as a passive, as they do not involve a reduction in transitivity and because there is no evidence that the object is promoted to subject. According to them, in these constructions, there is a deficient referentiality of the subject, without any change in transitivity, comparable to a construction without a specified subject. This seems to hold in Libras as well, since structures of this type maintain the grammatical agentive subject, in contrast to the true passivation process of BP.

There are, therefore, multiple ways of de-focusing the subject of a transitive sentence in Libras, but none of them results in a passive structure analogous to that of BP. As far as we know, there is no true passive construction in Libras. Given these observations, what options are there for blendings involving passives in BP? A short passive (with no *by*-phrase) in BP can be blended with the high-locus construction in Libras, as in (12). The sentence in Libras follows the same order as the passive sentence in BP; however, the verb ROUBAR ("to steal") is produced with movement from the neutral space towards the head (from lower to higher, since ROUBAR is a backwards verb). This movement is made to a high point in space, which corresponds to an indeterminate subject in Libras, which is not pronounced due to its indeterminacy, enabling Libras to overlap with BP with respect to passivization.

(12) Congruence at the word-order level

LIBRAS	CARTEIRA DV(carteira-no-bolso) wallet(wallet-into-pocket)	HOMEM IX(ele) man he	ROUBAR(down-up) stolen
BP	Carteira	homem	foi roubada
‘The wallet of the man was stolen.’			

https://youtu.be/6zaUWWRUtzo

A structure in which the *by*-phrase is maintained in BP was combined with a structure in Libras using the emphatic pronoun ELE-MESMO (“by himself”) to mark the agent. In (13), the emphatic pronoun indicates that Machado is the person who wrote the book. These blendings can be derivable, but unpreferred given that the use of ELE-MESMO to convey agency is not generally employed in Libras.

(13) Congruence at word-order level

LIBRAS	DEM that	LIVRO book	ESCREVER write
BP	Aquele	livro	escrito
LIBRAS	ELE-MESMO by-himself	FS (Machado) m-a-c-h-a-d-o	
BP		Machado	
‘That book was written by Machado.’			

https://youtu.be/K81TDxlL484

Incongruent combinations of BP passives with active sentences in Libras, as in (14), should not be possible, as they cannot be the output of a single derivational procedure.

(14) Incongruence at word-order level

LIBRAS	SENHOR IX(ele) Sir he	ELE-MESMO by-himself	IX(ele) he
BP	O escravo		
LIBRAS	COMPRAR IX(ele) buy he	ESCRAVO slave	
BP	foi comprado	pelo senhor	
‘The slave was bought by the master.’			

https://youtu.be/NAXXHldVWF0

Idioms

There seems to be some semantic requirements on blending, particularly that the combined sentences must make only one coherent proposition. Blends violating this requirement are readily rejected, even if they are syntactically congruent. Such cases were tested in our acceptability judgment task through blends involving idiomatic expressions. We included among our target items four combinations of idiomatic expressions with non-idiomatic sentences that were congruent at the meaning level (one sentential idiom and three VP idioms), as in (15), where the BP idiom *bateu as botas* ("die") is blended with the verb MORRER "to die" in Libras. Two blends of an idiomatic expression with lexically equivalent sentences without semantic correspondence (one sentential and one VP idiom) were also tested. We expected these cases to be rejected, as a single proposition is not delivered when the BP idiom is interpreted idiomatically, while the Libras content is interpreted literally. In (16), for instance, the sentences from Libras and BP are lexically equivalent; nevertheless, they are semantically mismatched as the sentence in Libras is not interpreted as an idiom.

(15) Correspondence at the semantic level

LIBRAS	PADRE priest	MORRER died
BP	O padre	bateu as botas
'The priest died.'		

https://youtu.be/Owq4Oitrcg0

(16) Non-correspondence at the semantic level

LIBRAS	PADRE *priest*	DV (cair) *beat*	DV (botas) *boots*
BP	O padre	bateu	as botas
'The priest beat the boots.'			

https://youtu.be/Dux20No9qIc

In total, the acceptability judgment task consisted of 31 target items. The sentences used as stimuli were chosen because they contrast congruent and incongruent structures in Libras and Portuguese with analogous meaning.

The judgment task was complemented with additional data collected directly with Codas explicitly discussing the target structures used in the acceptability judgment task. This elicitation was conducted in a conversational setting, in which

participants were asked to say how they would produce sentences with the target structures. We asked them to produce the sentences in various possible ways in Libras, trying to produce them using blends of Libras and Portuguese. In this follow-up task, which included 23 target items, we aimed at collecting sentences in which the usual word order for each language would be incongruent in some way, focusing particularly on instances in which the word order in Libras is verb final, while BP would hold its canonical SVO order. This set included sentences with handling verbs or depicting signs (Laszakovits et al. 2022). We also considered sentences with BP passive constructions since passives are not found in Libras, as discussed previously. When participants exhibited a high level of difficulty in blending, they were asked to produce the possible analogous sentences in Libras only, so that we could verify the structures allowed in this language.

3 Results

In general, participants assigned high scores to items in the congruent conditions. In contrast, items in the incongruent conditions received intermediate or low rates.

Results for the transitive sentence type indicate a high level of acceptance if both languages use the same word order, as in example (6). Incongruent combinations, with OV in Libras and VO in BP (examples (7) and (9) above), received low scores. However, blends in which BP follows Libras in using OV word order, as in (8), received high scores. Thus, we may say that there is a preference for maintaining the same word order even if this results in violation of BP word order.

Blended structures with both languages following the position of the negation in Libras (negation final, as in (10)) received high ratings. In addition, blended structures in which Libras used negation final while BP used pre-verbal negation (example (11)) received high ratings. This latter case is an example showing that incongruent blends can be generated due to late linearization.

Combinations like (13), where a bonafide passive with a *by*-phrase in BP is combined with a structure in Libras in which the agent is marked by the emphatic pronoun ELE-MESMO (“he himself”), were judged as intermediate. Blends like (14) were widely rejected by participants. These are cases of word-order incongruence stemming from structural mismatches, not simply late linearization.

We further explored restrictions on passive blends in the elicitation task, and the results indicate that congruent structures are always preferred. In the productions obtained, functional categories come from one of the blended languages (considered the primary language), with the secondary language following the imposed structure. Participants were asked to blend sentences with the same meaning but with different syntactic structures, such as a passive in BP and an active statement in Libras, but, as expected given the results obtained in the acceptability judgment task, they halted, responding that it was not possible. In some cases, they did not blend, producing an active sentence in Libras only. This is illustrated in (17)–(18).

When the experimenter insisted on blending, participants tried examples like (19), but rejected them.

(17)

Experimenter:	A menina	foi	machucada	pelo	cachorro
	the girl	was	hurt	by-the	dog

Participant:

LIBRAS (only)	CACHORRO dog	CL(pessoa) CL(person)	MORDER bite
LIBRAS (only)	PESSOA person	MULHER woman	
'The dog bit the woman.'			

https://youtu.be/4pl21zGGJNs

(18)

Experimenter:	A	Maria	foi	presa	pela	polícia
	the	Mary	was	arrested	by-the	police

Participant:

LIBRAS (only)	IX the	POLÍCIA police	PRENDER arrest	FS(maria) m-a-r-i-a
'The police arrested Mary.'				

https://youtu.be/Eo3dOZIKfvY

(19)

Experimenter:	A	Maria	foi	presa	pela	polícia.
	the	Maria	was	arrested	by-the	police

Participant:

LIBRAS	POLÍCIA police	PRENDER arrest	FS (maria) m-a-r-i-a
BP	Polícia	prendeu	Maria
'The police arrested Maria.'			

https://youtu.be/xSvuQX-z85o

In sum, based on the results from the elicitation task, it is clear that Libras does not structure passives as BP does. Thus, blends involving passives are not possible as such blends would impose non-equivalence in meaning and form.

As expected, combinations involving idiomatic expressions were acceptable if meaning consistency was observed. Thus, while (17) was fully accepted, (18) was fully rejected.

In the elicitation task, participants resisted blending idioms, including cases with semantic correspondence as in (15) and (20) and (21) below. Blends with literal translation equivalents ((21) and (23)) were not spontaneously produced either. These were produced only when the experimenter strongly encouraged the participants to do code-blending, but, in this situation, participants sought possible signs that could provide a good match with the meaning of the BP idiom trying to maintain structural congruency. Sometimes partial blends were produced with some parts of the BP idiom being conveyed in Libras. Interestingly, category matching was observed (e.g., noun with noun, verb with verb), even when the words had different meanings (as in (20)).

(20)

LIBRAS	MÃE mother	TER have	NAMORADO boyfriend	IDADE age
BP	Minha mãe	tem	um namorado	de
LIBRAS	40 forty	&=how	IX(ela) she	DAR+ give
BP	quarenta	anos	e ela	dá tudo
LIBRAS	TUDO all	DAR give	PESSOA person	IX (ele) he
BP	de mão	beijada	pra	ele

'My mom has a boyfriend that is 40 years old and she all "hand kissed" to him.' (this means that she gives everything to him)

https://youtu.be/2CQkoh9G848

(21)

LIBRAS	MÃE IX(ela) mother	PEGAR get	NAMORADO PESSOA boyfriend person	IDADE age
BP	Minha mãe	arrumou	um namorado	de
LIBRAS	40 forty	IX(ela) she	DAR+ give	DEM-MÃO her-hand
BP	quarenta anos	e ela	dá tudo	de mão
LIBRAS	BEIJAR-MÃO kiss-hand	DAR-MÃO give-hand	&=hand-up	
BP		beijada	pra ele	

'My mom got a boyfriend that is 40 years old and she gives all "hand kissed" to him.'

https://youtu.be/XX7grqI_CAs

(22)

LIBRAS		IX(ele) he	TRABALHAR work	POR-ISSO because
BP	Então	ele	trabalha	
LIBRAS	AMOR love	PROFISSÃO job		
BP	por amor		camisa	

"He works "by love of the shirt".' (this means that he works because he loves the job)

https://youtu.be/eOcyR01Qwdw

(23)

LIBRAS		IX(ele) he	TRABALHAR work
BP	Então	ele	trabalha
LIBRAS	PORQUE because	AMOR love	ROUPA shirt
BP		por amor	à camisa

'He works "by love of the shirt".'

https://youtu.be/KaJwotDjcjQ

In addition, code-switching was used as a strategy to produce structures with parallel meaning. In (21), for example, the participant used a gesture sign to express BEIJAR-MÃO, showing the act of kissing the hand as parallel meaning together with DAR-MÃO, which is only one sign in Libras. However, (21) was not judged as completely acceptable by its producer. In (22), there is no oral speech during the sign PROFISSÃO, and no sign during the oral production of *camisa*. The same is observed in (23), where PORQUE from Libras has no match in BP. Thus, participants code-switched whenever they did not find an appropriate way to produce blending while keeping congruency of form and consistency of meaning.

In the elicitation task, idioms from Libras were included and participants were asked to blend them with BP, as in (24) and (25). A translation expressing the same meaning in BP was often used preserving structural congruence. Interestingly, participants were less reluctant to produce blends with literal translations of Libras in BP, as in (24). Notice that in (25) code-switching is observed. Also, the signed idioms are very short (two signs).

(24)

LIBRAS	SINAL(André) sign(andré)	OLHO eye	CARO expensive
BP	O André tem um	olho	caro
'André has a rich eye.'			

https://youtu.be/XM2yhN6Rwl4

(25)

LIBRAS	SINAL(André) sign(andré)	OLHO CARO eye expensive	
BP	O André tem um	olhar	diferenciado
'André has a genuine way of seeing (things).'			

https://youtu.be/1uxlS0Wdv1I

Some participants declared that blends of idiomatic expressions are strange or funny.

4 Discussion

Overall observations from our acceptability judgment task and from our elicitation follow-up are in accordance with the predictions made by the Synthesis Model. Two important aspects of the model are relevant here: (a) blends must convey a single proposition, and (b) blends are outputs of a single derivation, which is derived by functional features coming from one of the blended languages or from both of them.

In the acceptability judgment task, congruent blends received high scores. This result is in accordance with the observations from the elicitation task, where congruent blends were readily produced.

As shown above, congruent blends may have the structure coming from one language, with the other just following along. This was accepted in general, but there was preference for preserving the structure from Libras, with BP tagging along.

Word-order incongruences received lower ratings. However, these incongruences were accepted in some cases when the two modalities employ different linearization orders. This was shown in the target sentences with the negation morpheme placed in different syntactic positions across the two languages. These sentences were overall accepted by participants.

While in the acceptability judgment task, participants judged several types of incongruent blends to be acceptable, in the elicitation task, when asked to actually produce these blends, the very same participants showed a tendency to respond in only one language, thus avoiding the blending process. Also, when explicitly requested to produce a blend, participants generally choose to structure the given sentence in one of the languages, using fewer words in the other language, or switching back and forth between the two languages and blending only in congruent parts. Thus, we may conclude that participants showed a general preference for congruent blends.

Importantly, semantic compatibility seems to be a stronger requirement than syntactic compatibility. That is, the semantic requirement of a single proposition must be met before syntactic congruency can even be considered. Participants also showed a strong preference for conveying meaning using Libras. This preference may be related to a pragmatic preference for Libras. This preference is illustrated by the observations obtained from idiomatic expressions. Even if syntactically congruent, blends that combined a BP idiom with a literal word-for-word translation equivalent in Libras were rejected. Since the productions in Libras were not interpreted idiomatically, this causes a semantic mismatch. Furthermore, in the elicitation task, participants strongly resisted blending idiomatic expressions from BP with Libras, although when explicitly requested, blends were produced with Libras matching the meaning of the BP idioms (e.g., example (20)). However, blends in the opposite direction – idiomatic expressions from Libras with literal word-for-word translation equivalents in BP – had higher acceptability responses, against our predictions. We interpret these findings as supporting the idea that the derivation itself allows blends of idiomatic expressions with literal meanings; however, restrictions on how meaning is conveyed in sign take preference over restrictions coming from BP. Altogether, we may say that blends of idioms are possible only in restricted cases. Furthermore, such blends may require a stronger mental effort, perhaps for processing reasons. Further research is needed for a more complete account of this.

Some comments on our methodology are in order. Kimmelman (2021) argues that, given modality-related and sociolinguistic specificities of sign languages, there are important methodological considerations for using the acceptability judgment methodology in sign linguistics. In the face of this observation, we consider several

factors. Importantly, sign languages exist in contact with spoken languages, which can lead to signers modifying their sign to adjust to the spoken language (Lucas and Valli 1989). In addition, signers are frequently in contact with less-fluent signers, who might be using contact signing or even an artificial form of signing that purposely follows the structure of the spoken language. Such sociolinguistic factors may interfere in results from judgment tasks, as observed by Kimmelman (2021). Furthermore, we noticed in our elicited data from bimodal bilinguals that some of them produced blended sentences naturally. However, others produced blended utterances as a kind of signed Portuguese, not using the natural type of co-production. There are differences between these two kinds of blended productions. These factors may influence the rated acceptability of the blended sentences presented in our task.

In general, the results reported above support the main theoretical assumption of the Synthesis Model, according to which a single derivational procedure underlies code-blends. In Branchini and Donati's (2016) proposal, code-blending involves two independent derivations, one in each language. The authors do not discuss any constraints on the simultaneous production of two languages, but we can assume that some kind of "one proposition" constraint is imposed on their analysis, that in blends, "the utterance is complete and meaningful only if the two fragments are integrated" (Branchini and Donati 2016, p. 22). Our interpretation is that this statement would not rule out various types of mismatching structures, such as actives blended with passives, which we found to be strongly rejected.

LIS and Italian, the languages studied by Branchini and Donati, are not as similar to each other as Libras and BP are. For example, while Italian uses basic SVO order, LIS uses SOV. Thus, structures that are both congruent and independently attested in LIS/Italian are much less common when compared to Libras/BP. It may well be that the need to produce incongruent blends in order to satisfy the demands of each language leads to a different outcome with respect to acceptability. We will leave this as open possibility, observing, nevertheless, that at least, blends from languages with similar structural constraints, particularly similar word orders, are strong evidence in favor of a single shared deviational procedure.

Overall, our results can be summarized as follows: bimodal bilinguals, when producing Libras and BP, may use a series of strategies to produce blends that are convergent in both languages, prioritizing formal and semantic congruence. Functional features from one of the languages might be selected to drive the derivation, with the other language just tagging along. Strategies used to avoid incongruent blends include code-switching, partial blending, and lexical fillings in the secondary language.

Acknowledgments We gratefully acknowledge the contribution of bimodal bilingual participants. None of this work would be possible without their generous involvement in our studies. We are also thankful to our collaborators and research assistants for their effort, especially Deanna Gagne, who has been a primary collaborator for the US version of the judgment task. This research is supported in part by Award Number #1734120, from the National Science Foundation (NSF), and by Award Number # 440337/2017-8 CNPQ. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NSF and CNPQ.

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